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PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE HONORABLE BOARD OF PATENT APPEALS AND INTERFERENCES

In re the Application of

Yasumitsu IKEGAMI

Group Art Unit: 2834

Application No.: 09/142,464

Examiner: M. Budd

Filed: September 9, 1998

Docket No.: JAO 40853

For: PIEZOELECTRIC RESONATOR, METHOD FOR MANUFACTURING SAME AND
PIEZOELECTRIC RESONATOR UNIT

REPLY BRIEF

Director of the U.S. Patent and Trademark Office
Washington, D.C. 20231

Sir:

In reply to the Examiner's Answer mailed February 8, 2002, Appellant submits the following additional remarks for consideration by the Honorable Board.

REMARKS

I. UV-Setting Type Resin and Connecting Layer

The present invention claims "a connecting layer formed with a conductive resin between a flat leading end portion and said electrode" and "a fixing layer made of a UV-setting resin." (See claims 1 and 14).

In the Brief on Appeal, Appellant noted that Ogiso '075 fails to teach or suggest using an adhesive agent other than to attach a ceramic case 32 to the surface of acoustic wave resonator 1. Nowhere does Ogiso '075 teach or suggest any embodiment of the resonator unit that includes both the UV-setting type resin and connecting layer as in the present invention.

Appellant notes that the Examiner has completely failed to respond to the argument that Ogiso '075 fails to teach or suggest a piezoelectric semiconductor including both the UV-setting type resin and connecting layer as presently claimed. Pennybacker does not remedy this significant deficiency of Ogiso '075. The present invention is distinguishable from Ogiso '075 and Pennybacker on this point alone.

II. U-shaped Support End

The Examiner's Answer argues that the difference between a U-shaped end for support elements of piezoelectric resonator as in the present invention and a V-shaped end for such elements as in Ogiso '075 is merely ornamental, and maintains that the V-shaped end of Ogiso '075 would have allegedly rendered the present invention obvious. Appellant respectfully disagrees with the Examiner's assessment.

First, one would not have been led to replace the V-shaped end of Ogiso '075 because changing the shape would destroy the intended function of the V-shaped branching of Ogiso '075. In particular, Ogiso '075 teaches that

By branching the connection end 25c into two or more sections, disposition while being combined with the bump 40 formed on the connection lands 7 can be easily performed. Therefore, the areas of the connection lands 7 can effectively be used and an excellent conduction with the bump 40 can be established. By providing the foregoing branch, the leads 25 can be strongly secured by the adhesive agent 26 so the surface acoustic wave resonator 1 is mounted by the cantilever method using the leads 25.

(See column 12, lines 33-41).

In other words, the V-shape of Ogiso '075 is present in order to position and hold a bump of the resonator and create a larger contact area between the bump and the end of the lead.

A U-shape would not allow for the same constraints as a V-shape, and thus would not retain the same function as required of the V-shape in Ogiso '075. A U-shape would allow a bump to move in a direction parallel to the base of the "U," i.e., left and right. In a V-shape,

however, once the bump is as low into the crotch of the "V" as possible, it cannot shift to the left and right as the branches of the "V" will not allow it to do so.

Further, even if the legs of the "U" are of the exact size to not allow such movement of the bump, manufacturing the U-shape to such consistent standards will be another design and possible defect variable.

Accordingly, the differences between a V-shape and a U-shape in terms of function in Ogiso '075 are not merely ornamental. In fact, as the U-shape would not desirably function for the intended purpose in Ogiso '075, one of ordinary skill in the art would not have been led to substitute a U-shape for a V-shape in Ogiso '075. In other words, the modification proposed by the Examiner would destroy a key function (positioning) of the V-shape in Ogiso '075.

The present invention does not require a "bump" for positioning the resonator. Instead, the present invention has an edge of the resonator that matches the U-shaped end of the present invention for substantial accuracy in positioning. The U-shaped end allows the edge of the resonator to be readily aligned with the end of the U-shaped opening, thus easily confirming the proper attaching position. In other words, the edge of the resonator may be readily made to be consistently at the same position because it is easily aligned with the end of the U-shape opening. This minimizes any variation in the position of the edge of the resonator.

A U-shaped opening is not obvious in view of the Ogiso '075 V-shaped opening because the V-shaped opening serves a different function than the U-shaped opening.

For instance, as set forth above, the V-shaped opening of Ogiso '075 is designed to position a bump between the two branches of a "V." The branches hold the bump and ideally does not allow the bump to shift in any direction except out of the "V" once the bump is in the crotch of the "V." A U-shape, however, unless the width of the legs is designed to be the

exact width of the bump, allows the bump to shift to the left and right (i.e., parallel to the base of the "U"). In addition, if the legs of the "U" are not the exact width of the bump, the bump will merely rest against the base of the "U." When a bump is held by a "V," the bump is held by two legs of the "V," thus increasing the contact area between the lead and the bump.

The Examiner, in the Examiner's Answer, further alleged that "An 'A' or 'W' would be just as appropriate since the idea is allegedly to increase surface available for bonding without the danger of entrapped air." (See page 3, lines 7-9 of the Examiner's Answer). Appellant respectfully submits that this assertion by the Examiner is purely speculative. Nowhere does Ogiso '075 teach or suggest using a V-shape or any other shape to increase surface area for bonding. Pennybacker also fails to teach or suggest any shape for increasing such surface area. Mere speculation is not sufficient to establish *prima facie* obviousness, particularly here where it is not obvious to substitute a U-shape for a V-shape for all the reasons discussed above.

Thus, Appellant submits that the V-shaped opening of the leading end of Ogiso '075 fails to render obvious the U-shaped opening of the leading end of the present invention.

Pennybacker was relied on as teaching a U-shaped opening for connecting to a piezoelectric element. Appellant respectfully disagrees.

Pennybacker does not teach or suggest a "flat leading end portion having a substantially U-shaped edge which opens toward a leading end of the leads." (See claim 1). Instead, Pennybacker teaches a "cup-like body" for a "crystal holder" (See column 1, lines 31-32). A cup-like body is different from a flat leading end portion having a substantially U-shaped edge. The U-shaped opening of the present invention does not completely surround the edge of the resonator the way that Pennybacker teaches enveloping a crystal holder with a cup-shape formation.

Further, Pennybacker does not teach or suggest a U-shaped opening for supporting a piezoelectric resonator. Instead, Pennybacker teaches a cup-like shape for hermetically sealing crystal holders within a unit. The cup-like shape does not affect the actual positioning of a piezoelectric resonator as in the present invention, but is used to seal off crystals from the outside environment.

It is respectfully indicated that the Examiner failed to respond to Appellant's arguments regarding Pennybacker and Pennybacker's failure to teach or suggest the present invention.

Appellant also points out that the Examiner has failed to meet his burden of (1) providing sufficient evidence that a U-shaped opening as in the present invention is known, and (2) establishing the required motivation to modify Ogiso '075 to include such a U-shape.

Thus, Appellant respectfully submits that Ogiso '075 and Pennybacker, whether taken singly or in combination, fail to teach or suggest the present invention.

III. UV Setting Resin

With regards to the UV setting resin, the Examiner asserts that there should be no consideration of the different physical distinctions between the present invention's UV setting resin versus any other epoxy because it allegedly merely provides a means to bond the joint. Appellant respectfully disagrees.

The present invention claims a fixing layer made of a UV setting type resin. This type of resin provides a temporary fixing layer for holding the resonator element onto the leading end portion of the lead, and can be set using UV radiation. Setting the resin with UV radiation is advantageous in so much as it limits the temperature increase to about a maximum of 60°C. Higher heating temperatures can result in deterioration of aging

properties and an increased chance of a fluctuation in frequency. The present UV setting type resin reduces occurrences of such temperature-dependent considerations.

Ogiso '075, however, fails to teach or suggest a UV setting type resin for fixing a resonator element onto the leading end portion of the lead as in the present invention. Ogiso '075 teaches only a soldering means which will drastically increase the temperature of the resonator as compared to the present invention. By introducing higher temperatures, Ogiso '075 will include the above-identified temperature-dependent drawbacks not experienced by the present invention.

Thus, the UV setting resin of the present invention obviates the disadvantages associated with the fixing means taught by Ogiso '075. Nowhere does Ogiso '075 acknowledge or suggest a means to avoid introducing heat to the resonator in order to fix the resonator element into the leading end portion of the lead. The present invention, however, fixes the resonator and the leading end of the lead without heat and thus does not introduce a further deterioration factor into the system as Ogiso '075 does.

The Examiner suggests that "all the reasons to use a UV or thermo setting epoxy for the non-conductive adhesive would be just as valid for the conductive resin."

Ogiso '075 does teach using a non-conductive adhesive agent between the ceramic case and the surface acoustic wave resonator. However, Ogiso '075 fails to teach using a non-conductive adhesive agent as a fixing layer as in the present invention to bind a resonator to the lead ends. Instead, Ogiso '075 teaches using a soldering layer despite the drawbacks arising from the increased temperatures. Ogiso '075 was apparently well aware of non-conducting adhesive agents, but did not use one. Thus, one of ordinary skill in the art would not have been led to the present invention having a UV-setting resin by a reading of Ogiso '075.

Thus, it easily follows that Ogiso '075 teaches away from using such non-conductive adhesive agents in the connecting layer, and thus does not teach or suggest the attributes of a UV setting type resin as in the present invention.

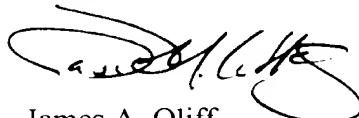
Pennybacker also fails to teach or suggest using a UV setting resin as a fixing layer as in the present invention.

Appellant submits that Ogiso '075 and Pennybacker, whether taken singly or in combination, fail to teach or suggest the present invention. Reconsideration and withdrawal of the rejection are respectfully requested.

IV. Conclusion

For all the above reasons, and the reasons stated in the Brief on Appeal, Appellant respectfully requests this honorable board to reverse the rejection of claims 1, 3-7, 14 and 16-20.

Respectfully submitted,



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